

What is claimed is:

1. A method of manufacturing a ferroelectric film including crystallizing a raw material including a complex oxide, the method comprising:

5 performing a heat treatment in a first condition in which a predetermined pressure and a predetermined temperature are applied; and

maintaining a second condition, in which a pressure and a temperature lower than the pressure and the temperature in the first condition are applied, after the heat treatment in the first condition,

10 wherein the raw material is crystallized by repeating the heat treatment in the first condition and the maintaining the second condition.

2. The method of manufacturing a ferroelectric film as defined in claim 1,

15 wherein the heat treatment in the first condition is performed at a pressure at two atmospheres or more and in an atmosphere containing oxygen at a volume ratio of 10% or less.

3. The method of manufacturing a ferroelectric film as defined in claim 1,

20 wherein the heat treatment in the first condition is performed at a pressure of two atmospheres or more using a rapid thermal annealing method.

4. The method of manufacturing a ferroelectric film as defined in claim 3,

wherein the heat treatment in the first condition is performed in an atmosphere containing oxygen at a volume ratio of 10% or less.

25 5. The method of manufacturing a ferroelectric film as defined in claim 1,

wherein the heat treatment in the first condition includes applying a pressure at

two atmospheres or more at least before raising a temperature.

6. A ferroelectric film manufactured by using the method of manufacturing a ferroelectric film as defined in claim 1.

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7. A ferroelectric memory comprising the ferroelectric film as defined in claim 6.

8. A method of manufacturing a ferroelectric capacitor, comprising:

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forming a lower electrode on a body;

forming a ferroelectric film on the lower electrode by crystallizing a raw material including a complex oxide; and

forming an upper electrode on the ferroelectric film,

wherein the crystallization includes:

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performing a first heat treatment in a first condition in which a predetermined pressure and a predetermined temperature are applied; and

maintaining a second condition, in which a pressure and a temperature lower than the pressure and the temperature in the first condition are applied, after the heat treatment in the first condition,

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wherein the heat treatment in the first condition and the maintaining the second condition are repeated.

9. The method of manufacturing a ferroelectric film as defined in claim 8,

wherein the first heat treatment in the first condition is performed at a pressure at

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two atmospheres or more and in an atmosphere containing oxygen at a volume ratio of 10% or less.

10. The method of manufacturing a ferroelectric film as defined in claim 8,  
wherein the first heat treatment in the first condition is performed at a pressure  
of two atmospheres or more using a rapid thermal annealing method.

5        11. The method of manufacturing a ferroelectric film as defined in claim 10,  
wherein the first heat treatment in the first condition is performed in an  
atmosphere containing oxygen at a volume ratio of 10% or less.

12. The method of manufacturing a ferroelectric film as defined in claim 8,  
10        wherein the first heat treatment in the first condition includes applying a  
pressure at two atmospheres or more at least before raising a temperature.

13. The method of manufacturing a ferroelectric capacitor as defined in claim 8,  
wherein a second heat treatment, in which a temperature higher than the  
15        temperature in the first condition is applied, is performed at least after forming the  
upper electrode.

14. The method of manufacturing a ferroelectric capacitor as defined in claim  
13,  
20        wherein the second heat treatment is performed at a pressure of two atmospheres  
or more.

15. The method of manufacturing a ferroelectric capacitor as defined in claim  
13,  
25        wherein the second heat treatment is performed by using a rapid thermal  
annealing method.

16. The method of manufacturing a ferroelectric capacitor as defined in claim  
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wherein the second heat treatment is performed in an atmosphere containing  
oxygen at a volume ratio of 10% or less.

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17. A ferroelectric capacitor manufactured by using the method of  
manufacturing a ferroelectric capacitor as defined in claim 8.

18. A ferroelectric memory comprising the ferroelectric capacitor as defined in  
10 claim 17.